Author Index

Asano, T., see Karube, I., 279

Bader, J., Günther, H., Nagata, S., Schuetz, H.-J., Link, M.-L. and Simon, H.
Unconventional and effective methods for the regeneration of NAD(P)H in microorganisms of crude extracts of cells, 95
Becker, Y., see Shaham, M., 351
Bellgardt, K.H., see Kuhlmann, W., 171
Beppu, T., see Kawaguchi, Y., 307
Beyeler, W., see Meyer, H.-P., 341
Blake-Coleman, B.C., see Clarke, D.J., 135
Boyer, M.H., Chambost, J.P., Magnan, M. and Cattanéo, J.
Carboxymethyl-cellulase from *Erwinia chrysanthemi*. I. Production and regulation of extracellular carboxymethyl-cellulase, 229
Boyer, M.H., Chambost, J.P., Magnan, M. and Cattanéo, J.
Carboxymethyl-cellulase from *Erwinia chrysanthemi*. II. Purification and partial characterization of an endo-β-1,4-glucanase, 241
Brodelius, P., see Vogel, H.J., 159
Butler, M. and Spier, R.E.
The effects of glutamine utilisation and ammonia production on the growth of KHK cells in microcarrier cultures, 187

Calder, M.R., see Clarke, D.J., 135
Carlson, J. and Messing, J.
Efficiency in cloning and sequencing using the single-stranded bacteriophage M13, 253
Carr, R.J.G., see Clarke, D.J., 135
Cattanéo, J., see Boyer, M.H., 229, 241
Chambost, J.P., see Boyer, M.H., 229, 241
Chase, H.A.
Scale-up of immunoaffinity separation processes (*Minireview*), 67
Chorev, M., see Shaham, M., 351
Clarke, D.J., Blake-Coleman, B.C., Calder, M.R., Carr, R.J.G. and Moody, S.C.
Sensors for bioreactor monitoring and control – a perspective (*Minireview*), 135
Claus, R., see Fischer, B., 111
Cogoli, A., see Tschopp, A., 287

Demain, A.L., see Wu, J.-H.D., 81
Dhillon, G.S., Nagasawa, T. and Yamada, H.
L-Cysteine-synthesizing enzyme from 3-chloro-L-alanine resistant *Bacillus sphaericus* L-118, 47

Fiechter, A., see Leisola, M.S.A., 331
see Meyer, H.-P., 341, 335
see Ulmer, D.C., 13
Fischer, B., Claus, R. and Kleber, H.-P.
Isolation and characterization of the outer membrane of *Acinetobacter calcoaceticus*, 111
Furutani, Y., see Honjo, M., 265

Goodman, A.E., Strzelecki, A.T. and Rogers P.L.
Formation of ethanol from lactose by *Zymomonas mobilis*, 219
Günther, H., see Bader, J., 95

Holt, G., see Smith, T.M., 37
Honjo, M., Manabe, K., Shimada, H., Mita, I., Nakayama, A. and Furutani, Y.
Cloning and expression of the gene for neutral protease of *Bacillus amyloliquefaciens* in *Bacillus subtilis*, 265

Itoh, S., see Karube, I., 279

Kanzaki, H., see Yamada, H., 205
Karube, I., Matsunaga, T., Suzuki, S., Asano, T. and Itoh, S.
Immobilized antibody-based flow type enzyme immunosensor for determination of human serum albumin, 279
Karube, I., Tamiya, E. and Matsuoka, H.
Electrochemical estimation of protoplast population, 197
Kato, N., Yamagami, T., Kitayama, Y., Shimao, M. and Sakazawa, C.
Dismutation and cross-dismutation of aldehydes, and alcohol:aldehyde oxidoreduction by resting-cells of *Pseudomonas putida* F61-a, 295

Kawaguchi, Y., Shimizu, N., Nishimori, K., Uozumi, T. and Beppu, T.
Renaturation and activation of calf prochymosin produced in an insoluble form in *Escherichia coli*, 307
Kitayama, Y., see Kato, N., 295
Kleber, H.-P., see Fischer, B., 111
Kuhlmann, W., Meyer, H.-D., Bellgardt, K.H. and Schügerl, K.
On-line analysis of yeast growth and alcohol production, 171

Leisola, M.S.A., Ulmer, D.C., Waldner, R. and Fiechter, A.
Role of veratryl alcohol in lignin degradation by *Phanerochaete chrysosporium*, 331
Leisola, M.S.A., see Ulmer, D.C., 13
Leist, C., see Meyer, H.-P., 355
Lewis, M.L., see Tschopp, A., 287
Link, M.-L., see Bader, J., 95
Lowe, C.R.
New developments in downstream processing (*Minireview*), 3

Magnan, M., see Boyer, M.H., 229, 241
Manabe, K., see Honjo, M., 265
Marquardt, R., Wöhner, G. and Winnacker, E.-L.
Properties of plasmids from *Methylomonas clara*, 317
Matsunaga, T., see Karube, I., 279
Matsuoka, H., see Karube, I., 197
Messing, J., see Carlson, J., 253
Meyer, H.-D., see Kuhlmann, W., 171
Meyer, H.-P., Beyeler, W. and Fiechter, A.
Experience with the on-line measurement of culture fluorescence during cultivation of *Bacillus subtilis, Escherichia coli* and *Sporotrichum thermophile,* 341
Meyer, H.-P., Leist, C. and Fiechter, A.
Acetate formation in continuous culture of *Escherichia coli* K12 D1 on defined and complex media (*Short Communication*), 355
Mita, I., see Honjo, M., 265
Mitani, Y., see Tani, Y., 119
Moody, S.C., see Clarke, D.J., 135
Morrison, D.R., see Tschopp, A., 287

Nagasawa, T., see Dhillon, G.S., 47
see Yamada, H., 205
Nagata, S., see Bader, J., 95
Nakayama, A., see Honjo, M., 265
Nishimori, K., see Kawaguchi, Y., 307

Okada, H., see Toyama, H., 25

Pretorius, I.-M., see Rawlings, D.E., 129

Rawlings, D.E., Pretorius, I.-M and Woods, D.R.
Construction of arsenic-resistant *Thiobacillus ferrooxidans* recombinant plasmids and the expression of autotrophic plasmid genes in a heterotrophic cell-free system (*Short Communication*), 129
Rogers, P.L., see Goodman, A.E., 219

Sakazawa, C., see Kato, N., 295
Saunders, G., see Smith, T.M., 37
Schuetz, H.-J., see Bader, J., 95
Schügerl, K., see Kuhlmann, W., 171
Shaham, M., Chorev, M. and Becker, Y.
Further characterization of the ataxia-telangiectasia clastogenic factor by reversed-phase liquid chromatography (*Short Communication*), 351
Shimada, H., see Honjo, M., 265
Shimao, M., see Kato, N., 295
Shimizu, N., see Kawaguchi, Y., 307
Shinmyo, A., see Toyama, H., 25
Simon, H., see Bader, J., 95
Smith, T.M., Saunders, G., Stacey, L.M. and Holt, G.
Restriction endonuclease map of mitochondrial DNA from *Penicillium chrysogenum*, 37
Spier, R.E., see Butler, M., 187
Stacey, L.M., see Smith, T.M., 37
Strzelecki, A.T., see Goodman, A.E., 219
Suzuki, S., see Karube, I., 279

Tamiya, E., see Karube, I., 197
Tani, Y., Yonehara, T., Mitani, Y. and Yamada, H.
ATP production by sorbitol-treated cells of a methanol yeast, *Candida boldinii (Kloeckera* sp.), 119
Toyama, H., Yokoyama, T., Shinmyo, A. and Okada, H.
Interspecific protplast fusion of *Trichoderma*, 25
Tschopp, A., Cogoli, A., Lewis, M.L. and Morrison, D.R.
Bioprocessing in space: Human cells attach to beads in microgravity, 287

Ulmer, D.C., Leisola, M.S.A. and Fiechter, A.
Possible induction of the ligninolytic system of *Phanerochaete chrysosporium*, 13
Ulmer, D.C., see Leisola, M.S.A., 331
Uozumi, T., see Kawaguchi, Y., 307

Vogel, H.J. and Brodelius, P.
An in vivo ^{31}P NMR comparison of freely suspended and immobilized *Catharanthus roseus* plant cells, 159

Waldner, R., see Leisola, M.S.A., 331
Winnacker, E.-L., see Marquardt, R., 317
Wöhner, G., see Marquardt, R., 317
Woods, D.R., see Rawlings, D.E., 129
Wu, J.-H.D., Yang, L. and Demain, A.L.
Further studies on the role of phenylalanine in gramicidin S biosynthesis by *Bacillus brevis*, 81

Yamada, H., Kanzaki, H. and Nagasawa, T.
Synthesis of L-cystathionine by the γ-replacement reaction of cystathionine γ-lyase from *Streptomyces phaeochromogenes*, 205
Yamada, H., see Dhillon, G.S., 47
see Tani, Y., 119
Yamagami, T., see Kato, N., 295
Yang, L., see Wu, J.-H.D., 81
Yokoyama, T., see Toyama, H., 25
Yonehara, T., see Tani, Y., 119

Subject Index

acetate formation, continuous culture, defined and complex media, *Escherichia coli* K12 D1, 355

***O*-acetylserine sulfhydrylase**, 3-chloro-L-alanine resistant strain, L-cysteine-synthesizing enzyme, 3-chloro-L-alanine, 47

acinetobacter, outer membrane, protein pattern, 111

acoustic resonance, sensors, biosensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, low and radio frequency spectroscopy, spectroscopic methods, 135

adherent cell, bioprocessing in space, animal cell, microcarrier, 287

affinity chromatography, downstream processing, high-performance liquid affinity chromatography, affinity partition, ultrafiltration affinity purification, affinity precipitation, 3

affinity partition, downstream processing, affinity chromatography, high-performance liquid affinity chromatography, ultrafiltration affinity purification, affinity precipitation, 3

affinity precipitation, downstream processing, affinity chromatography, high-performance liquid affinity chromatography, affinity partition, ultrafiltration purification, 3

affinity sensors, sensors, biosensors, computer control, enzyme-sensitised sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135

agarose, P NMR, *Catharanthus roseus*, immobilization, alginate, phosphate metabolism, cytoplasmic pH, vacuolar pH, 159

alcohol, on-line analysis, *Saccharomyces cerevisiae*, yeast, 171

alcohol : aldehyde oxidoreduction, dismutation of aldehydes, cross-dismutation of aldehydes, *Pseudomonas putida* F61-a, formaldehyde dismutase, 295

alginate, P NMR, *Catharanthus roseus*, immobilization, agarose, phosphate metabolism, cytoplasmic pH, vacuolar pH, 159

ammonia, microcarrier, cell culture, glutamine, glucose, 187

animal cell, bioprocessing in space, microcarrier, adherent cell, 287

antibiotic, phenylalanine, gramicidin S, *Bacillus brevis*, biosynthesis, fermentation, 81

arsenic-resistant plasmid, *Thiobacillus ferrooxidans* recombinant plasmid, expression *T. ferrooxidans* gene, autotrophic bacterial gene expression, 129

ataxia-telangiectasia, clastogenic factor, chromosome damage, reversed-phase liquid chromatography, 351

ATP production by yeast, methanol yeast, sorbitol-treated yeast cells, 119

autotrophic bacterial gene expression, *Thiobacillus ferrooxidans* recombinant plasmid, arsenic-resistant plasmid, expression *T. ferrooxidans* gene, 129

Bacillus amyloliquefaciens, neutral protease, gene cloning, expression, *B. subtilis*, catabolite repression, 265

Bacillus brevis, phenylalanine, gramicidin S, biosynthesis, antibiotic, fermentation, 81

Bacillus subtilis, *B. amyloliquefaciens*, neutral protease, gene cloning, expression, catabolite repression, 265

Bacillus subtilis, culture fluorescence, on-line, interferon, *Escherichia coli, Sporotrichum thermophile*, 341

bioprocessing in space, animal cell, microcarrier, adherent cells, 287

bioreduction, NAD(P)H regeneration, methylviologen-dependen NAD(P)H formation, deuterated NAD(P)H, Clostridia, yeast, 95

biosensors, sensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio

frequency spectroscopy, spectroscopic methods, 135
biosynthesis, phenylalanine, gramicidin S, *Bacillus brevis*, antibiotic, fermentation, 81

carboxymethyl-cellulase, *Erwinia chrysanthemi*, production, regulation, 229
catabolite repression, *Bacillus amyloliquefaciens*, neutral protease, gene cloning, expression, *B. subtilis*, 265
Catharanthus roseus, P NMR, immobilization, agarose, alginate, phosphate metabolism, cytoplasmic pH, vacuolar pH, 159
cell culture, microcrarrier, ammonia, glutamine, glucose, 187
characterization, *Erwinia chrysanthemi*, endonuclease, 241
3-chloro-L-alanine, 3-chloro-L-alanine resistant strain, *O*-acetylserine sulfhydrylase, L-cysteine-synthesizing enzyme, 47
chromosome damage, ataxia-telangiectasia, clastogenic factor, reversed-phase liquid chromatography, 351
chymosin, prochymosin, renaturation, 307
clastogenic factor, ataxia-telangiectasia, chromosome damage, reversed-phase liquid chromatography, 351
Clostridia, NAD(P)H regeneration, methylviologen-dependent NAD(P)H formation, deuterated NAD(P)H, yeast, bioreduction, 95
computer control, sensors, biosensors, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135
continuous culture, acetate formation, defined and complex media, *Escherichia coli* K12 D1, 355
continuous flow dilution sampling, sensors, biosensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135
cross-dismutation of aldehydes, dismutation of aldehydes, alcohol : aldehyde oxidoreduction, *Pseudomonas putida* F61-a, formaldehyde dismutase, 295
culture fluorescence, on-line, interferon, *Bacillus subtilis, Escherichia coli, Sporotrichum thermophile*, 341
L-cystathionine, cystathionine γ-lyase, γ-replacement reaction, *Streptomyces phaeochromogenes*, pyridoxal-phosphate dependent enzyme, 205
cystathionine γ-lyase, γ-replacement reaction, L-cystathionine *Streptomyces phaeochromogenes*, pyridoxal-phosphate dependent enzyme, 205
L-cysteine-synthesizing enzyme, 3-chloro-L-alanine resistant strain, *O*-acetylserine sulfhydrylase, 3-chloro-L-alanine, 47
cytoplasmic pH, P NMR, *Catharanthus roseus*, immobilization, agarose, alginate, phosphate metabolism, vacuolar pH, 159

defined and complex media, acetate formation, continuous culture, *Escherichia coli* K12 D1, 355
deuterated NAD(P)H, NAD(P)H regeneration, methylviologen-dependent NAD(P)H formation, Clostridia, yeast, bioreduction, 95
dismutation of aldehydes, cross-dismutation of aldehydes, alcohol : aldehyde oxidoreduction, *Pseudomonas putida* F16-a, formaldehyde dismutase, 295
downstream processing, affinity chromatography, high-performance liquid affinity chromatography, affinity partition, ultrafiltration affinity purification, affinity precipitation, 3

electrochemical sensors, sensors, biosensors, computer control, enzyme-sensitized sensors, affinity sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135
electrode, protoplast, redox dye, 197
endoglucanase, *Erwinia chrysanthemi*, characterization, 241
endonuclease, mitochondrial DNA, *Penicillium chrysogenum*, restriction map, 37
enzyme-sensitised sensors, sensors, biosensors, computer control, affinity sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135
Erwinia chrysanthemi, carboxymethyl-cellulase, production, regulation, 229
Erwinia chrysanthemi, endoglucanase, characterization, 241

Escherichia coli, culture fluorescence, on-line, interferon, *Bacillus subtilis, Sporotrichum thermophile*, 341
***Escherichia coli* K12 D1**, acetate formation, continuous culture, defined and complex media, 355
ethanol from lactose, *Zymomonas mobilis*, Tn*951*, 219
expression, *Bacillus amyloliquefaciens*, neutral protease, gene cloning, *Bacillus subtilis*, catabolite repression, 265
expression *T. ferrooxidans* gene, *Thiobacillus ferrooxidans* recombinant plasmid, arsenic-resistant plasmid, autotrophic bacterial gene expression, 129

fermentation, phenylalanine, gramicidin S, *Bacillus brevis*, antibiotic, biosynthesis, 81
flow-type immunoreactor, immunosensor, immobilized antibody, human serum albumin, 279
formaldehyde dismutase, dismutation of aldehydes, cross-dismutation of aldehydes, alcohol : aldehyde, oxidoreduction, *Pseudomonas putida* F61-a, 295

gamma-replacement reaction, cystathionine γ-lyase, L-cystathionine, *Streptomyces phaeochromogenes*, pyridoxal-phosphate dependent enzyme, 205
gene cloning, *Bacillus amyloliquefaciens*, neutral protease, expression, *B. subtilis*, catabolite repression, 265
glucose, microcarrier, cell culture, ammonia, glutamine, 187
glutamine, microcarrier, cell culture, ammonia, glucose, 187
gramicidin S, phenylalanine, *Bacillus brevis*, biosynthesis, antibiotic, fermentation, 81

high-performance liquid affinity chromatography, downstream processing, affinity chromatography, affinity partition, ultrafiltration affinity purification, affinity precipitation, 3
human serum albumin, immunosensor, immobilized antibody, flow-type immunoreactor, 279

immobilization, P NMR, *Catharanthus roseus*, agarose, alginate, phosphate metabolism, cytoplasmic pH, vacuolar pH, 159
immobilized antibody, immunosensor, flow-type immunoreactor, human serum albumin, 279
immunoaffinity separation processes, scale-up, 67
immunosensor, immobilized antibody, flow-type immunoreactor, human serum albumin, 279
induction, *Phanerochaete chrysosporium*, lignolytic system, 13
interferon, culture fluorescence, on-line, *Bacillus subtilis, Escherichia coli, Sporotrichum thermophile*, 341

lignin, *Phanerochaete chrysosporium*, veratryl alcohol, 331
lignolytic system, *Phanerochaete chrysosporium*, induction, 13
low and radio frequency spectroscopy, sensors, biosensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, spectroscopic methods, 135

methanol yeast, ATP production by yeast, sorbitol-treated yeast cells, 119
Methylomonas clara, plasmids, physical characterization, properties, 317
methylviologen-dependent NAD(P)H formation, NAD(P)H regeneration, deuterated NAD(P)H, Clostridia, bioreduction, 95
microcarrier bioprocessing in space, animal cell, adherent cell, 287
microcarrier, cell culture, ammonia, glutamine, glucose, 187
mitochondrial DNA, *Penicillium chrysogenum*, restriction map, endonuclease, 37
M13 subcloning, shotgun DNA sequencing, synthetic primers, 253

NAD(P)H regeneration, methylviologen-dependent NAD(P)H formation, deuterated NAD(P)H, *Clostridia*, yeast, bioreduction, 95
neutral protease, *Bacillus amyloliquefaciens*, gene cloning, *B. subtilis*, catabolite repression, 265

on-line, culture fluorescence, interferon, *Bacillus subtilis, Escherichia coli, Sporotrichum thermophile*, 341
on-line analysis, *Saccharomyces cerevisiae*, yeast, alcohol, 171
optrodes, sensors, biosensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135

outer membrane, *Acinetobacter*, protein pattern, 111

Penicillium chrysogenum, mitochondrial DNA, restriction map, endonuclease, 37
Phanerochaete chrysosporium, lignin, veratryl alcohol, 331
Phanerochaete chrysosporium, lignolytic system, induction, 13
phenylalanine, gramicidin S, *Bacillus brevis*, biosynthesis, antibiotic, fermentation, 81
phosphate metabolism, P NMR, *Catharanthus roseus*, immobilization, agarose, alginate, cytoplasmic pH, vacuolar pH, 159
physical characterization, *Methylomonas clara*, plasmids, properties, 317
piezoelectric sensors, sensors, biosensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135
plasmids, *Methylomonas clara*, physical characterization, properties, 317
prochymosin, chymosin, renaturation, 307
production, *Erwinia chrysanthemi*, carboxymethyl-cellulase, regulation, 229
properties, *Methylomonas clara*, plasmids, physical characterization, 317
protein pattern, *Acinetobacter*, outer membrane, 111
proton NMR, *Catharanthus roseus*, immobilization, agarose, alginate, phosphate metabolism, cytoplasmic pH, vacuolar pH, 159
protoplast, electrode, redox dye, 197
protoplast fusion, *Trichoderma reesei, T. viride, T. koningii*, 25
***Pseudomonas putida* F61-a**, dismutation of aldehydes, cross-dismutation of aldehydes, alcohol : aldehyde oxidoreduction, formaldehyde dismutase, 295
pyridoxal-phosphate dependent enzyme, cystathionine γ-lyase, γ-replacement reaction, L-cystathionine, *Streptomyces phaeochromogenes*, 205

redox dye, protoplast, electrode, 197
regulation, *Erwinia chrysanthemi*, carboxymethyl-cellulase, production, 229
renaturation, prochymosin, chymosin, 307
restriction map, mitochondrial DNA, *Penicillium chrysogenum*, endonuclease, 37
reversed-phase liquid chromatography, ataxia-telangiectasia, clastogenic factor, chromosome damage, 351

Saccharomyces cerevisiae, on-line analysis, yeast, alcohol, 171
scale-up, immunoaffinity separation processes, 67
sensors, biosensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135
shotgun DNA sequencing, synthetic primers, M13 subcloning, 253
sorbitol-treated yeast cells, methanol yeast, ATP production by yeast, 119
spectroscopic methods, sensors, biosensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes, piezoelectric sensors, thermistors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135
Sporotrichum thermophile, culture fluorescence, on-line, interferon, *Bacillus subtilis, Escherichia coli*, 341
Streptomyces phaeochromogenes, cystathionine γ-lyase, γ-replacement reaction, L-cystathionine, pyridoxal-phosphate dependent enzyme, 205
synthetic primers, shotgun DNA sequencing, M13 subcloning, 253

thermistors, sensors, biosensors, computer control, enzyme-sensitised sensors, affinity sensors, electrochemical sensors, Optrodes piezoelectric sensors, continuous flow dilution sampling, acoustic resonance, low and radio frequency spectroscopy, spectroscopic methods, 135
***Thiobacillus ferrooxidans* recombinant plasmid**, arsenic-resistant plasmid, expression *T. ferrooxidans* gene, autotrophic bacterial gene expression, 129
Tn*951*, *Zymomonas mobilis*, ethanol from lactose, 219
Trichoderma, protoplast fusion, *T. reesei, T. viride, T. koningii*, 25

ultrafiltration affinity purification, downstream processing, affinity chromatography, high-

performance liquid affinity chromatography, affinity partition, affinity precipitation, 3

vacuolar pH, P NMR, *Catharanthus roseus*, immobilization, agarose, alginate, cytoplasmic pH, phosphate metabolism, 159

veratryl alcohol, *Phanerochaete chrysosporium*, lignin, 331

yeast, NAD(P)H regeneration, methylviologen-dependent NAD(P)H formation, deuterated NAD(P)H, Clostridia, bioreduction, 95

yeast, on-line analysis, *Saccharomyces cerevisiae*, alcohol, 171

Zymomonas mobilis, ethanol from lactose, Tn *951*, 219